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CLEANSING THE DUNGHILL: WATER SUPPLY AND SANITATION IN PERTH 1878-1912

SU-JANE HUNT AND GEOFFREY BOLTON

After half a century of backwardness Western Australia in the 1880s embarked upon an unprecedentedly rapid period of growth. During this era of railway building and the gold rushes the population increased tenfold, to 300,000 in 1912. At the same time the level of prosperity and of expected living standards improved markedly. Demands for the provision of public services grew much faster than the availability of resources to meet them or of civil servants and politicians able to devise solutions to the host of problems which pressed upon them. Models of public administration or private involvement developed in Britain and eastern Australia did not always prove appropriate to local conditions.

Among the social demands generated during that period questions of public health and sanitation figured prominently and led eventually to a major degree of formal intervention by the Western Australian government. This was not the result of a preconceived preference for state control. On the contrary, successive administrations tried to remit the initiative to municipal corporations, statutory boards, and where appropriate to private enterprise. In the absence as yet of a thorough exploration of the processes by which Western Australia's administrative machinery, fashioned before 1890 to meet the needs of a slow-growing and paternalistically governed Crown Colony, was overhauled to cope with the great upsurge of social demands generated by the long boom, it may be useful to trace the forces making for increased government intervention in public health and sanitation.

Largely by default, the colonial government before 1890 retained almost total responsibility for health and medical services. Because of the sparsity of Western Australia's population and the lack of potential local philanthropists, it was not feasible for the government to abandon much of its responsibility for the provision of hospital and medical services, as occurred for instance in New South Wales at the end of transportation.¹ The lack of community involvement was enhanced by the

fact that it was only in 1871 that an adequate framework for local government was set up. Moreover, because of its isolation Western Australia during the first half-century of white settlement enjoyed considerable periods of immunity from a number of epidemic diseases which might otherwise have provoked lively public concern. There was only one outbreak of measles, in 1860, and this, although destructive of Aboriginal life, largely spared the white population. Fearing that where measles came smallpox might come after, the authorities set up a Central Vaccine Board in that year, but its ministrations were not thorough, and the disease arrived in 1869. Once again it was mainly the Aborigines who suffered, notably in the districts north of Perth.² Bubonic plague and cholera were completely unknown in those years. Of most concern to the colony's medical authorities were the diseases resulting from primitive sanitation: typhoid, dysentery, and enteritis. Diphtheria was introduced in 1864, and although quiescent for several years in the 1870s was never absent subsequently. It is also likely that during the 1860s and 1870s the problem was becoming exacerbated in Perth by the movement to drain away many of the swamps and lakes immediately north of the city. This may have been a response to the great floods of 1862, when there was a continuous sheet of water from Lake Monger to Claize Brook, but it also reflected the demand for good arable land close to town. Thus between 1870 and 1873 the purchasers of allotments at Lake Henderson subscribed funds for the drainage of the lake by a convict working party so that the land could be used for market gardening.³ The draining of these lakes influenced well levels and natural drainage patterns, and this may have affected the quality of the wells from which Perth's domestic water supply was then largely derived.

The first spokesman to address himself consistently to the problems of sanitation was Dr Alfred Waylen. Notable as the first locally born medical practitioner, Waylen was educated in Britain during the 1840s and 1850s, and as a young man must have been aware of the Chadwickian movement towards sanitary reform. After serving as resident medical officer at the Swan for thirteen years, he was colonial surgeon from 1872 to 1895. In his early years of office he showed himself a good deal of a reformer. He introduced bathrooms into the Colonial Hospital, employed the first female nurses, and with an environmental wisdom rare in his generation, urged the planting of Perth's streets with quick-growing species of eucalyptus. He came at a period marked by a high death rate from zymotic disease—as many as 137 in 1875. In a colony of fewer than 30,000 inhabitants that was an appalling mortality; in the Western Australia of today, with 1.1. million inhabitants, a road toll of about three hundred is thought to constitute a serious social problem justifying substantial research and expenditure. Waylen knew well where the worst afflicted areas were found:

Most of the cases which were sent into hospital from Perth were from the low-lying portions of the City. This is of considerable extent: it is inhabited chiefly by artisans and laborers, who live in cottages built with but little regard for sanitation. There is often a total absence of ventilation, as well as of drainage, and it is to these defects that, when towards the middle of winter the ground becomes saturated with water, the presence of fever may be ascribed.⁴

A year previously the acting colonial surgeon, Dr Shaw, spelt out in graphic detail the living conditions of the average Perth householder:

There is plenty of water to be obtained in Perth by sinking wells; it is more or less pure, but sometimes of an opalescent or muddy colour, nauseous taste, and putrescent

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smell; this is no doubt to be ascribed in a great measure to the absence of any kind of sanitary precaution, in preventing contamination of the water by soakage from cesspools into the wells; often, indeed, this occurrence is favoured by the construction of cesspits close to and on higher ground than the well . . .

The houses are nearly all detached, and standing in about an acre of ground; they are built of brick, and roofed with shingles, and generally have a verandah back and front. A few yards behind each house is a closet, with an open unbricked cesspit, and again a few yards from this the well, usually about twelve feet deep, from which water is drawn for drinking and all other purposes. The cesspits are sometimes emptied, the soil being either carted away and used as manure or buried in the stable dunghheap. On a still night the passer through the streets of Perth is made to feel most disagreeably the effect of these arrangements.⁵

Dr Henry Calvert Barnett, the resident medical officer at Fremantle, was so dissatisfied with conditions at the port that he wrote and published at his own expense a pamphlet urging the introduction of the dry-earth system with a regular collection of nightsoil and disposal through sewage farms. 'We all obtain our water, in this Colony, from wells', he wrote, 'and in the great majority of cases those wells are sunk in close proximity to one or more cesspools; the well pierces the porous and filth-soaked soil to a greater depth than its foul neighbour, and becomes poisoned and abominable beyond description.'⁶

Apathy and inertia greeted these revelations. Few Western Australians shared, either from travel or from professional insight, their medical practitioners' appreciation of the colony's backwardness in sanitation. The most prosperous citizens already enjoyed the use of earth-closets, and showed the usual reluctance of those who have paid for their own luxuries to let others have them at the public expense. Moreover the winters between 1876 and 1879 were relatively dry and cold, so that the wells were not so lethally polluted and the death rate fell. Nevertheless a recently arrived director of public works, J. H. Thomas, was so appalled by conditions at the Girls' and Infants' School and elsewhere that in September 1877 he wrote a memorandum urging a stringent tightening of the health regulations. In the absence of a piped water supply the Perth City Council should be required to enforce the adoption of earth closets in every household, with a regular system of collection.⁷ Waylen supported him, and the governor (Ord) and colonial secretary (Goldsworthy), both very recent arrivals in the colony, were strongly in accord. So it was that in January 1878 a public meeting was convened to consider the question. Over sixty prominent citizens attended, among them leading officials, medical practitioners, and members of the Perth City Council including their chairman, the rising young lawyer S. H. Parker.⁸

On the face of it a fair degree of consensus was reached. Goldsworthy made a strong speech asserting that the citizens of Perth were living on a dunghill. They must take steps to improve the city's sanitation and ensure the health of future generations. Resolutions were passed endorsing these views and urging that the government should assist the City Council financially in introducing a dry-earth system. A sub-committee was created to bring a plan before the Council. It was chaired by the crown solicitor, G. W. Leake, and included an engineer, two city councillors, and Waylen. They reported that the City Council possessed power to introduce a compulsory dry-earth system—provided that a special rate was imposed to cover the costs of regular collection. These were estimated at seven shillings and sixpence each for the installation of earth closets, and £1,000 a year on the rates for collection. This was where the Council jibbed. At a meeting in April 1878 the coun-

cillors one after another declared that because of the expense it would be premature to go ahead with any change in the present system. Parker, with one eye on his impending candidature for a Perth seat in the Legislative Council, encouraged this reaction. As an advocate of responsible government he was apt to look askance at any idea emanating from the colony's Imperial officials, and he certainly resented Goldsworthy's comparison of Perth with a dunghill. Satisfied that the problem of Perth's contaminated water supply could be met by the prosecution of individual nuisances, the City Council shelved the issue and fended off subsequent prodding by the government. It was in vain that Governor Ord made public his view that the Council showed the narrow vision of an English parish vestry; in vain that the secretary of state for colonies in London spoke of an urgent need for reform; in vain that Goldsworthy harped on the subject to Parker.⁹ No further progress was made until the arrival of the energetic Governor Napier Broome in 1883.

In Broome's first year of office Western Australia was visited by a succession of epidemics. The first outbreak of measles since 1860 hit a whole generation of colonists previously unexposed to the disease, and led to considerable dislocation of business. Many Aborigines died of measles or influenza during that cold and rainy winter. The conditions also favoured an upsurge of typhoid and diphtheria among the working class inhabitants of Perth. 'Fever and diphtheria may be looked on as endemic diseases in Perth and Fremantle fostered by sewage contamination of air and water', Waylen reported to the new governor, adding a little wanly that he had been so long commenting on the subject that he did so again only 'in the hope that, ere long, municipal councils will become alive to a sense of their duty.'¹⁰ Broome's response was immediate. In July 1884, shortly after the receipt of Waylen's report, he invited the Legislative Council's attention to the problem. A select committee was set up, found that it had not time enough for a thorough study, and was replaced in November by a strong commission of inquiry under Waylen's chairmanship. Waylen by now may have been growing conservative—before many years he would be found resisting the introduction of the telephone to the Colonial Hospital as a newfangled device for which there was no necessity—but his zeal was kept alive by a younger colleague, Dr Edward Scott. Among the new generation of medical practitioners arriving in the colony Scott, a 32 year old product of St Thomas's was foremost as a campaigner for health reform. He was reinforced by a late addition to the commission, William Traylen. A Wesleyan clergyman serving at Greenough and York, Traylen was such an obsessive advocate of teetotal principles that eventually he parted company with the ministry and set up as a printer and founder-editor of the *Temperance Advocate*. A man who urged others to drink water had a particular interest in the quality of the public supply, and in Traylen's case this interest was sharpened by a considerable knowledge of chemistry and technology; in fact, his public lectures on scientific subjects were probably enjoyed more than his sermons.¹¹ There was to be no more single-minded champion of sanitary reform than Traylen, and his presence on the Commission, together with Waylen and Scott, guaranteed that its findings would be positive and constructive.

The Commission found that despite an increasing population little if any improvement was perceptible in Western Australia's urban sanitation. 'In Winter, most of the yards of Fremantle are one mass of filth,' reported the municipal inspector.¹² A bakery in High Street took the prize for squalor: 'the yard covered in large pools of animal filth and sewage, and the cesspit, which is at the corner of the stables smelling very foul; the well here is within fifteen yards of the cesspit.' Conditions in the workmen's cottages of Perth were hardly better. In one terrace two closets 'un-

provided with either bucket or cesspit' served 26 residents. At the government offices the closet cesspit used by the general public was 'very badly kept' and the smell most offensive, whereas the closet on the automatic principle (for heads of departments only) was clean. Cesspits, the Commission declared, must be abolished; but lasting improvement would come only when the city had a fresh and dependable water supply.

Four sources suggested themselves. Rainwater could be stored in tanks, but in the 1880s corrugated iron was only just being introduced to Western Australia. Some affluent citizens purchased 400 gallon iron brewers' tanks in which malt had been brought from England. Wells were still the main source of domestic supply, and the Commission suggested that a public supply might be drawn from deep wells sunk in the limestone to the west of the city. This was clearly a limited expedient despite some improvement in technology, ranging from the invention in 1887 by a Mr Richardson of the 'Pertholian Tubular Well Pump'¹³ to the increasingly widespread use of windmills as a source of energy for pumping. It is not clear whether the Commission paid much attention to Perth's sub-artesian water resources. Apart from the sinking of a bore at Gosnells in the early 1870s and another in the vicinity of the Perth railway station used during the 1880s to supplement the town's water supply, this source had not been systematically explored, and in 1885 the government geologist, E. T. Hardman, pronounced it hopeless to expect artesian water in the Perth region.¹⁴ Lake Monger was one possibility, and the Commission recommended its reservation by the Crown as a precautionary measure. Eventually, however, it would be necessary to pipe water from the Helena or some other stream issuing from the Darling Range. Such a feat of engineering, involving a distance of nineteen miles and an estimated outlay of £100,000, could be thought excessively ambitious. Western Australians were nowhere near the frame of mind which would enable them, before a dozen years had passed, to swallow Sir John Forrest's decision to fund a pipeline to Coolgardie. Nevertheless, the Commission's report represented a major shift in thinking about the problem of Perth's sanitation and water supply, and raised the question of the pattern of administrative control to be followed in the future.

In approaching this problem Western Australians do not appear to have paid much attention to the precedents set in larger Australian cities, and these were in any case too various to be of much use. In the four eastern colonies, sanitation and public health were originally seen as the responsibility of municipalities. As early as 1863 the Queensland government overrode the Brisbane City Council by placing control of the city water supply in the hands of a nominated board.¹⁵ In Sydney and Melbourne, with much greater populations and with piped water and sewerage systems dating back to the 1850s, the insufficiency of municipal control was becoming increasingly apparent. Within the space of a few years control would be vested in a major statutory corporation: the Board of Water Supply and Sewerage created in 1888 in New South Wales, and the Melbourne and Metropolitan Board of Works set up in 1890. In South Australia, where the long dry summers of Adelaide approximated conditions in Perth, control of water supply and sewerage was vested from 1881 in the Commissioner of Public Works. This was not perceived as an appropriate model for Western Australia. Caught up as they were in the movement for responsible government, men such as Scott and Parker differed only in their view of the role of municipal governments in matters of sanitation and public health. To Parker, want of finance was the clinching explanation for the lack of progress in this field; let the municipal councils be subsidised adequately by a sympathetic government, and reform would follow. To Scott, particularly before he became mayor in 1888, the councils showed a

want of energy in using the powers which they already had. Alternative devices were needed for securing public participation in the administration of health and welfare.

At a by-election in June 1886 Scott defeated Traylen and the 'radical' John Horgan to become one of the members for Perth in the Legislative Council, and thus to take part in the legislation following the Sanitary Commission's report of the previous year. Following the Commission's advice, the government proposed the creation of a five-man Central Board of Health, whose membership should include at least one medical practitioner, one qualified engineer, and one practical builder. This should be supplemented by a system of local boards of health with power to remove nuisances, disinfect premises, distribute free medicine, secure the removal of cesspits, and levy rates through the agency of the local municipal council. This part of the scheme was deliberately framed to make good the deficiencies of the municipal councils, and was supported not only by Scott, who criticised the lax administration of local authorities, but also by the mayor of Perth, George Shenton, who drew an analogy between the proposed boards of health and the role of the Central Board of Education, and furthermore urged the government to take the initiative in providing a metropolitan waterworks. Other members with strong local government connections were less pleased. George Randell, a former mayor of Perth, moved that the powers of the local boards of health should be vested in the municipalities, and was backed by Parker and the two Fremantle members, Marmion and Pearse. Scott and Shenton were backed by the officials and rural members, and Randell's amendment was defeated; but the omens were not good for co-operation between the new local boards of health and the town councils.¹⁶

It was at this point that the municipal authorities began to recapture some of the initiative. In Fremantle at least since 1874 a supply of piped water had been available from the wells within Fremantle Gaol for the use of shipping, the railway station, and a number of public establishments. From 1880 agitation began for the supply to be extended to the use of private residents. A new well was sunk about sixty feet in the prison yard, and a system of tunnels dug by convict labour to provide the basis for a reticulated water supply which was operative by May 1888.¹⁷ This made Fremantle the first reticulated district in the colony. In Perth the initiative was taken by Saunders and Barrett, two of the city councillors who had been most prominent in previous years in debates over water supply and sanitation. Their aim was to provide the city with a piped supply from the Darling Range by private enterprise, and after three months' search they selected a site on Munday's Brook, about 25 kilometres south-east of Perth. Their next task was to generate a demand from the ratepayers for a water supply, and here William Traylen took a hand. Having inspected the site he drummed up enough signatories to induce the mayor, Shenton, to hold a public meeting. The main official speaker was Dr Waylen, but in Traylen's recollection it was the combined eloquence of himself and the lawyer R. S. Haynes that carried the necessary resolutions and got the Perth City Council to the negotiating table.¹⁸ During the course of discussions Saunders and Barrett dropped out, and the agreement to construct the pipeline was eventually undertaken by a Melbourne-based syndicate, Neil McNeil & Co. The local representative of the syndicate was Edward Keane, contractor for the Midland Railway, timber entrepreneur, and a bold and persuasive speculator who within a few years of his arrival was already a power in the community.

An agreement was signed on 21 October 1889 and ratified by legislation shortly afterwards. It provided for the construction of a 240 million gallon reservoir on Munday's Brook—to be named, predictably, after Queen Victoria—and a storage reservoir on Mount Eliza. The waterworks would be controlled by a five man board of

management including the mayor of Perth and one other councillor. The annual water rate would not exceed a shilling in the pound, in return for which the citizens of Perth could expect a piped water supply adequate to service one bath-tub and one water-closet. Those who wished to consume greater quantities, either for the conduct of hotels and businesses or because — and here was a major source of temptation — they wished to prettify the environment with lawns and private gardens, would be required to pay for the installation of a meter so that they could be charged for excess water. The most controversial feature of the agreement was a provision giving the City Council the right to purchase the waterworks at any time between 1899 and 1914, but only in consideration of a bonus of one third over and above the capital of the undertaking. This provision was hotly attacked by one or two councillors representing the less affluent sectors of the community, notably T. G. A. Molloy, and there was a certain amount of press correspondence along the lines: 'Save our fair city from being further burdened for the benefit of a few speculators'.¹⁹ There were nevertheless compelling pressures on Dr Scott, as mayor of Perth, to push through with the agreement. 'Colonial fever', that recurrent but ill-defined malady, had recently been identified as a variant of typhoid by Dr Adam Jameson, thus reinforcing the urgency of providing an acceptable piped water supply.²⁰ The introduction of responsible government was imminent, and the withdrawal of Downing Street paternalism was likely to result in the thrusting of more responsibility upon the municipal authorities. Going by the experience of the other Australian colonies, nobody could have foreseen that John Forrest's appointment as premier in December 1890 would usher in ten uninterrupted years of strong leadership, nor that the autonomous colonial government under any premier would wish to retain the same extensive policies of state intervention as had necessarily characterised the pre-1890 government. Forrest himself seems to have held the view for some years after assuming office that it would be preferable for the government to withdraw as far as possible from direct involvement in the management of public health. It was preferable to give greater responsibility to statutory corporations such as the Central Board of Health or the board which was eventually set up in 1895 to manage the Colonial Hospital in Perth. Conformably with this view Forrest saw water supply and sanitation as an appropriate field for municipal control, though he came to accept government control as the next best thing.²¹ All this lay well into the future in 1889. The immediate problem for Scott and his councillors was to get a reliable supply of piped water to Perth, and in the absence of adequate funds of its own the Council had no other option than to make the best bargain it could with a private entrepreneur.

Work commenced on the Victoria reservoir in February 1890 and the opening ceremony took place on 3 October 1891. The official party travelled to the site up the newly constructed zig-zag railway that connected Midland Junction to Canning Mills, the heart of Edward Keane's timber concession. It was very much Keane's day. Not only was he the water company's best-known representative in Perth — though he asserted that his formal connexion terminated at the end of 1890 — but also he was the dominant timber lessee of the district surrounding the reservoir and a few months previously had become mayor of Perth. After his wife declared the reservoir open Keane made a brief, blunt speech saying that the works were constructed very well, and that after spending £160,000 on construction the company 'were not going to throw it away'; and then invited the guests to a luncheon banquet under a large marquee with a badly leaky roof.²² Perhaps because of this unhappy omen there was a somewhat contentious note to some of the champagne toasts. George Shenton, now colonial secretary, stated that he felt the government should control the works and

that such an important undertaking should not be the responsibility of a private firm. Another cabinet minister paid soothing compliments to Keane, but it was clear that Shenton had touched on a sore point. For with the unprecedented influx of population into Western Australia as a result of the gold rushes, consumer demand would swell to unanticipated heights. It would be hard enough to meet legitimate public demand, without having to consider a private company's expectations of profit. The mediation of conflicting interests would be particularly difficult when the official protecting the public interests, the mayor of Perth, was also closely connected with the waterworks company and a timber lessee whose operations would soon be seen to present a serious pollution hazard at the source of the water supply.

Keane soon ran into trouble. Within a fortnight of the opening ceremony he found himself facing an acrimonious meeting of ratepayers set up by his old antagonist, Molloy. The mood of the meeting in the Town Hall was set when Molloy was greeted with ringing cheers and Keane with profound silence. Molloy attacked the company for gross overcharging of working class clients, both generally and in specific cases. He complained of lack of public consultation, and hinted strongly at graft. His fellow-councillor, Hugh McKernan, made much of the conflict of interest among Keane's roles. The meeting resolved not to pay rates to the company until reasonable prices were fixed. The Perth City Council was also urged to set up a special committee to investigate the problems arising from the running of the waterworks.²³ Under this stimulus an agreement was reached on 4 December 1891 between the Perth City Council and the company fixing an amended scale of charges for water rates, excess metered water, and installation costs. Keane's conciliatory tactics may have been due to an imminent by-election for the Legislative Assembly seat of Perth, for which he intended to be a candidate. If so, he was disappointed as Molloy rather unexpectedly beat him. Shortly afterwards in March 1892 Keane resigned from the mayoralty. The outcome of this skirmish indicated that the power of private capital was not always strong enough to resist even a relatively modest amount of public agitation and complaint. In the volatile Western Australia of the early 1890s conflicts of interest over public utilities called for political solutions. George Shenton's logic would be hard to resist. The metropolitan water supply must become a government responsibility.

For most of those who valued greater public participation in issues of health and sanitation, it was still the municipal level which was seen as deserving encouragement. The experiment with local boards of health set up by Dr Scott's initiative in 1886 was not widely welcomed. In country centres where only a limited number of individuals took part in public life the membership of the local board of health often overlapped with that of the municipal council. If the two boards agreed, one was superfluous; if they quarrelled, little was achieved. Friction also occurred between the two boards in Perth, largely because of the City Council's disquiet at having to levy and administer rates suggested by the Board of Health, a body irresponsible to the ratepayers. In 1891 De Hamel and Hassell, the members of the Legislative Assembly for the Albany district, moved that the municipal councils should assume the functions of the local board of health, though leaving the authority of the Central Board of Health unimpaired. They were supported by such veteran Perth City councillors as Randell, Quinlan, and Traylen (who argued for increased powers at both the central and local level). Only Dr Scott and one other member expressed concern that the municipal councils would not be strict enough. The motion was passed, only to run into a very hostile reception in the Legislative Council. G. W. Leake, who as long ago as 1878 had been chairman of the committee which fruitlessly urged the Perth City Council to improve its practices, now reminded the upper house 'that a number of small tene-

ments which are a mass of the vilest filth, were before the Act of 1886 was passed, owned by members of the Municipality'.²⁴ It was unlikely that they would have mended their ways. Other members of the Legislative Council were piqued at having a new piece of legislation sprung on them late in the session without due preparation, and they quickly threw it out. During the rest of 1891, however, some judicious lobbying must have gone on, because when in December the government introduced a motion in almost identical terms to De Hamel's, it passed both houses without a ripple.

This development increased Traylen's authority as the member of the Perth City Council who was chairman of the local board of health, and marked the start of the most pertinacious political campaign of his career: the fight to ensure a pure water supply for Perth. Although he sat in the Legislative Assembly as representative for Greenough, the undemanding rural constituency where he had once been resident clergyman, the whole focus of Traylen's considerable energy was now concentrated on the needs of the Perth metropolitan area, and specifically to its sanitation. If some of his fellow-citizens called him 'Water on the brain', more respected his earnestness, but not to the extent of following him into commitments that might be seen as increasing the ratepayers' burden. He launched his first attack in March 1892, moving the adjournment of the Legislative Assembly to draw attention to the health hazards caused by the pollution of Munday's Brook by the Canning jarrah mills. His revelations of typhoid cases at the mill and of the pollution of watercourses by human and animal manure were able to draw from Sir John Forrest the acknowledgement that something would have to be done to rectify the matter, probably in the next session of parliament.²⁵ Traylen withdrew his motion; but on the next evening, claiming to have uncovered fresh evidence of the gravity of the Victoria Reservoir's pollution, moved that the catchment area should be placed under the jurisdiction of the Perth City Council board of health. A prudent campaigner, he had drafted and printed the bill at his own workshop, so as to avoid technical and procedural reasons for delay. His surprise tactics worked, and the bill went through both houses.²⁶ Unfortunately it soon emerged that the Perth Board of Health lacked power to enforce improved conditions at the Canning mills. Accordingly Traylen set to work to prepare a more far-reaching bill amending the Public Health Act of 1886 to make substantial increases in the powers of local boards of health. Traylen's proposals would have empowered the municipalities to impose sanitary measures on the catchment areas of their local water supply. It was further proposed to enable councils (doubling as local boards of health) to ban the use of cesspits and to impose a double-pan system of sanitary removal, granting the right of collection to contractors for a fixed term. Such powers would have strengthened the role of Western Australia's local authorities, and might have helped to bring about the active tradition of municipal enterprise which many, and Forrest among them, thought at least in theory desirable.

The proposals were not approved. Once again, after passing the Legislative Assembly with comparatively little difficulty, Traylen's schemes ran into trouble with the nominee Legislative Council.²⁷ J. A. Wright, speaking with the authority of one who had been the colony's last director of public works under Imperial government, scorned the proposals as impracticable. Local boards of health were unsuited to exercise the autocratic powers which the bill would give them over catchment areas of ill-defined extent, or over the rights of citizens:

We might have a Local Board with all sorts of fads and ideas. It might order that bath water should be taken round in a pail to water the garden belonging to the chairman.²⁸

Winthrop Hackett pointed out that the legislation influenced the whole colony because of a problem which was solely and specifically Perth's, and rebuked the Forrest government for shirking its responsibility and leaving anti-pollution measures to an enthusiastic back-bencher. Once the bill was referred to a select committee chaired by Wright its fate was sealed. So many objections were raised to its provisions that S. H. Parker, now government spokesman in the Legislative Council, agreed to drop the bill.²⁹ Ever persistent, Traylen re-introduced his bill in September 1893, cutting out the bits which the Legislative Council seemed to find most objectionable. This time the bill passed, but with its provisions still further diluted by the Legislative Council. Apart from giving the Perth City Council the green light for introducing a system of double-pan collection by sanitary contractors the legislation in its eventual form did little to strengthen the City Council's hand against environmental pollution.³⁰ This was partly because the Legislative Council was running true to its form of protecting the rights of property-owners against any sort of official interference; but it also reflected a growing doubt as to whether the Perth City Council could be expected to control water supply and sanitation in a metropolitan area which, with the gold rushes of 1892-93, was every month expanding further beyond the bounds of the city proper. The most constructive contribution in the Legislative Council was made by Hackett, who had the advantage over most of his colleagues of having visited and observed at first hand the Sydney sewerage works, and was accordingly a convinced advocate of deep drainage.³¹

Traylen apparently took the hint, and at the next session of parliament in August 1894 moved a resolution 'that the healthfulness of Perth cannot be preserved without a sewerage scheme and water supply under the same control'.³² Without becoming too specific, he was seeking a vote in favour of a common authority similar to that already operating in Sydney and Melbourne. This was too visionary even for the Legislative Assembly. Septimus Burt, at his most irritatingly logical and sardonic, asserted that sanitation was distinctly a municipal matter, that the Perth City Council was not using its existing powers to prosecute cases of pollution, and that the cost of £200,000 was beyond the resources of the colony. Sir John Forrest simply said that Perth was not big enough, and the people did not want sewerage. Even members sympathetic to Traylen, such as George Randell, were deterred by the cost, which they believed would be particularly great because of the sandy nature of the Perth coastal plain. Better to await the lead of bigger cities such as Brisbane, said others, or the possibility of further improvements in science and technology. Traylen in defeat was at his most impressive. Having reminded his hearers of the continuing infant mortality occurring in Perth due to surface pollution, he concluded:

My good friends who live in their splendid houses, with their pleasant gardens and happy surroundings, and who know nothing about these troubles I have referred to, forget to sympathise with those who haven't such surroundings and who have troubles enough.³³

As will appear, the consciences of his good friends in parliament were not much troubled by these considerations.

By now the continued expansion of Perth's population was placing grave strains on the water supply. Any attempt at improving and expanding the service placed the Perth City Council in what seemed an insoluble bind. Under the 1889 agreement the City Council on taking over the waterworks would be obliged to pay a sum equivalent of one and one third times its capital value to the vending company. As the company had found its operations unprofitable it might be prepared in 1894 to accept a

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compromise price; but if as a result of Perth's growth the system had to be greatly expanded, this would continually increase the cost to the City Council. To some councillors the logical step was to seek parliamentary approval for an immediate offer of purchase instead of waiting until 1899, and in November 1894 Walter James accordingly moved in the Legislative Assembly for consent to seek the ratepayers' approval for this. The mayor, Alexander Forrest, who shared his brother's views on municipal control, was acquiescent; but Traylen and Randell by now were convinced that a statutory corporation responsible to the government would be needed. James's motion passed the Legislative Assembly nevertheless, but met opposition in the Legislative Council, where two city councillors F. T. Crowder and Hugh McKernan, spoke of the pollution from Canning Mills and elsewhere which was continuing to afflict the city's water supply, and speculated aloud whether the company might not be allowing conditions to deteriorate in order to force the City Council's hand. This was enough to persuade the Legislative Council to burke the motion.³⁴ Thus at the end of 1894 the Western Australian parliament had rejected both Traylen's proposal for the control of water and sewerage by a common statutory authority and Walter James's proposal for control by the Perth City Council. Perth was to struggle on with the status quo for another two years, while immigrants continued to arrive in unprecedented numbers.

As new suburbs ringed the city, social gaps widened. In the affluent districts of Peppermint Grove and Claremont a private entrepreneur, James Grave, provided a fairly efficient service despite financial vicissitudes.³⁵ North of the city such new working class suburbs as Highgate and Woodville (now North Perth) fared less well. The limited piping provided by the company was incapable of meeting the increase in demand. Even when connected to the main system such districts suffered during periods of high demand in summer, because the flow of water was too low for pumping to these suburbs. Conditions were worst in the canvas towns where many transients camped, drawing water from over-used wells or swamps. The inevitable result was a marked increase in deaths from typhoid. In 1893 there were no more than 28 deaths from typhoid in the whole of Western Australia. In later years the figures reported for the city by the mayor of Perth were:

	Cases	Deaths
1895	566	70
1896	663	89
1897	1408	134
1898	800	74
1899	200	19
1900	410	39

It is possible that some cases went unreported. Nearly all were among the poorer classes.³⁶

After the summer of 1895-6 produced some of the hottest weather for many years, the Forrest government could procrastinate no longer. In August 1896 Forrest sought and obtained parliamentary consent for the purchase of the waterworks at a price of £220,000. As one city councillor in the Legislative Assembly observed at the time, a government which had just decided to commit itself to the expenditure of £2,500,000 for a water supply for the Coolgardie goldfields could not logically do otherwise than take responsibility for the metropolitan supply.³⁷ Given the overtaxed condition of the Department of Public Works, it was not surprising that the Forrest government decided to remit control of the system to an independent Metropolitan Waterworks

Board, as previously urged by Traylen, but its choice of a salaried chairman was astonishing. This was Edward Keane, still a director of the timber mills which continued to pollute the Victoria Reservoir, and moreover recently bankrupt for £250,000. His colleagues were Talbot Hobbs, architect and future army general, T. W. Hardwick, and the mayor of Perth as an honorary ex officio member, but Keane's was essentially the guiding hand. The new board assumed its responsibilities in October 1896, just in time to confront the 'water famine' which came in the northern suburbs with the onset of another summer. This year public opinion was much earlier mobilized to protest against the lack of effective services, and in the second week of November correspondence came thick and fast to the city's newspapers:

Sir — I am unfortunately a resident of Lamb Street and for the last three weeks have scarcely been able to get a drop of water from the service pipes on my premises, although I am told by a friend of mine whose place of business is in the Terrace, that they, the people in the Terrace, are never without a strong supply . . .³⁸

We, that is the residents of Highgate Hill, have only had the water on twice during the last three weeks, and then only for an hour or two at the most . . . Surely the Government might manage in such a way that we would have it on at least twice a week at a certain time . . . It was bad enough when the company had it, but there is simply no water at all now . . .³⁹

From another section of the town:

There would be quite a famine in our neighbourhood, but for the existence of two or three wells, from which troops of women and girls can be seen daily carrying water.⁴⁰

Public grievances were added to private complaints. Some objected to the use of river water for laying the dust of the city streets because it left an offensive smell. Others were concerned at the fire hazard in a town without adequate water.⁴¹ For most it was the shortage of household water that meant most; as one correspondent wrote:

If we had only been lucky enough to have the management living in this street . . . I think that they would soon see a way to get water here.⁴²

Palliatives were attempted. A temporary service of water carts was introduced, and pumps set up in the districts most affected by water shortages to draw bore water for domestic use. This still meant that the women and children of working class households found themselves carting tubs and buckets through the sandy, unpaved streets for up to several hundred yards, or waiting up until midnight or 1 a.m. for the sound of the water carter's bell. There were limits to the patience of even these politically inarticulate groups, and by mid-January public discontent reached such a pitch that a water carter travelling down Brown Street, East Perth was stoned by the local inhabitants.⁴³ Even the *West Australian* and the *Morning Herald* were joining in the outcry. Keane responded with an aggressive interview.⁴⁴ He outlined the measures taken by the board to improve the situation, stating that three thousand tons of piping was on order, but delay was occurring because the Railways Department refused to give priority to freighting them; and this at least spurred the Railways Department into promises of greater co-operation. Keane then went on to attack the selfishness of a minority of large consumers, most of them living in areas such as Adelaide Terrace and St George's Terrace, where they could draw water from the mains before it reached the Mount Eliza Reservoir, and thus diminished the quantity available for

suburban users. Of nearly 700,000 gallons consumed in 24 hours on one summer day in Perth, 191,810 gallons were accounted for by no more than 195 users. A Mrs Drifffield was the most lavish private consumer, with 5,600 gallons, but other large users included such prominent and allegedly responsible citizens as Sir John Forrest (2,000 gallons), Alexander Forrest (1,800 gallons), and other leading legislators and civil servants. In an age which has come to accept the even-handed application of water restrictions, it is hard to appreciate the blithe indifference with which Perth's more privileged citizens squandered water on their green lawns and imported trees while the majority were getting little or none. It is even more surprising that this lack of social conscience provoked little overt public criticism. Keane himself was open to censure, as a few weeks later the press revealed that the Canning Mills timber operation was still polluting the streams supplying the Victoria Reservoir with sewage, dead animals, and refuse from its two sawmills. A sample of reservoir water was sent to Melbourne for analysis, and pronounced contaminated with a strong risk of typhoid.⁴⁵ Rather than risk the closure of the timber concession, Keane arranged that the stream running in front of the Canning Mills should be diverted so that it did not flow into the reservoir. This cost the Metropolitan Waterworks Board about £4,000 of public money, but at least abated a long-standing nuisance.

Keane's cavalier attitude to public money was in the end his downfall. In his view the emergency justified the cutting of bureaucratic corners, and during 1897 he could point to such improvements as the construction of a 21 inch main from Victoria Reservoir to Mount Eliza and the sinking of further bores in the city; but his slapdash accountancy was beginning to draw unfavourable comment from the auditor-general. In December 1897 A. P. Matheson, one of the individuals named by Keane in the previous summer as an excessive consumer, moved in the Legislative Council that the board should not be entrusted with the expenditure of further government money. Although the motion met with some sympathetic comment it was negatived, and indeed on the same day Sir John Forrest in the Legislative Assembly was proposing to increase the board's powers.⁴⁶ This may have been partly the consequence of investigations which had at last been undertaken during 1897 into potential sewerage schemes for the city. No immediate action resulted from this inquiry, and early in 1898 20 of Perth's leading medical practitioners drew up a petition for Walter James to lay before parliament urging the adoption of deep sewerage as necessary to curb the inroads of typhoid.⁴⁷ Such a major development involved consideration of the future role of the Metropolitan Waterworks Board. Much depended on whether Keane's success in reducing complaints outweighed his rather prodigal spending in order to get results. The government made no move, and when parliament met in August 1898 it was left to B. C. Wood, one of the members most experienced in local government, to move for a select committee to investigate the workings of the board. Even then, it did not look as if Keane's head would roll; Quinlan, a member of the select committee, made a point of calling him the only competent member of the board.⁴⁸ Then came Jove's thunder. Sir John Forrest had himself added to the select committee, made chairman, and proceeded to lead a searching cross-examination of the board's officers. The select committee found that the board, although energetic, went well beyond its powers in making excess expenditure of £20,000 and failing to pay interest. The board was also condemned for accepting high tenders—justified by Keane because of the urgency of improving Perth's water supply—for various acts of mismanagement, and for accepting tenders from sources in which Keane had a vested interest.⁴⁹ It was hard even for those members of parliament who praised Keane's improvement of Perth's water supply to gainsay the findings of the select committee. Sir John Forrest had chosen the

timing of his intervention astutely, knowing that within a few weeks another inquiry would reveal that in the course of composing his personal finances Keane had bribed the official receiver in bankruptcy and fudged his statement of assets and liabilities.⁵⁰ Lapsing deeper into bankruptcy, he would be unable to fight the select committee's findings, and would make a useful scapegoat.

Protesting ineffectually that they had been 'treated in an unconstitutional manner'⁵¹ the members of the board resigned. Three options were recommended by the select committee. In order of Forrest's personal preference they were reversion of control to the Perth City Council, direct government control, or retention of the board with the engineer-in-chief as chairman. In the event none of these courses was chosen. Instead, Forrest decided to appoint a new board, this time with William Traylen as chairman. Delighted with his opportunity, Traylen addressed himself to his duties with great energy, and for over five years until mid-1904 was the driving force behind policy-making. In some respects his term of office saw considerable progress. Having weathered initial unpopularity because of the raising of the rates and other economies, the board under Traylen introduced an aeration process to purify the unsatisfactory quality of domestic water, built a new reservoir on Mount Eliza, increased the capacity of the Victoria Reservoir, and sank more bores. Reticulation was extended to the new municipalities of Leederville, Subiaco, and Victoria Park, as well as to parts of Mount Lawley and North Perth. The government assumed responsibility for the Fremantle water supply in 1899 and the Peppermint Grove system in 1903. Unfortunately serious defects also became apparent in Traylen's management. The single-minded obstinacy which made him such an effective campaigner for sanitary reform prevented him from heeding advice or delegating authority. Some of his decisions resulted in waste or over-capitalisation. Others reflected personal pique, and he showed injudicious favouritism in promoting his sons' careers as employees of the board. The Perth City Council's part in the management of the board was null; Alexander Forrest as mayor was either too busy or too irked by Traylen's bossiness to attend meetings, and none of his transient successors played an active part in the board's affairs until Harry Brown (mayor 1903-05). Meanwhile, complaints about Traylen's conduct provoked a select committee of the Legislative Council under the chairmanship of T. F. O. Brimage in 1902.⁵² This committee amply exposed many of Traylen's shortcomings, but retribution followed slowly. It was not until 1904 that the Daglish government superseded the board and placed its operations directly under the minister for works, but when this happened it was with bipartisan support in parliament, with the strongest approval coming from Mayor Brown.⁵³ It was a disappointing end to Traylen's career as a reformer, and showed that the time had gone by when the management of the city's sanitation and water supply could be entrusted to the administration of an amateur, no matter how zealous and well intentioned. Henceforth the need was for control by professional engineers directly responsible to a ministerial head.

The engineers deserved the credit for the eventual provision of a sewerage system. Since the 1897 investigation any decision to proceed with implementation had hung fire because of the estimated cost of £500,000. In October 1901 the engineer-in-chief, Savage, reported that adoption of a new bacterial process would reduce the cost to £300,000, and experimental tanks and filter beds were installed at Government House as a practical experiment. Despite an outbreak of bubonic plague and continuing cases of typhoid, and despite the still imperfect quality of Perth's water supply, it was not until 1906 that work commenced on the construction of a system with an outlet on the Swan River at Claisebrook. This site, on a former public park, was chosen in preference to an ocean outfall at North Cottesloe or a site at Crawley near the present

University of Western Australia. Not without further criticism from the press, the work took six years to accomplish, and it was not until 1912 that Perth enjoyed the benefits of an operating sewerage system. In the interval those who could afford between £50 and £200 installed their own tanks, and the pan system of collection and disposal was extended into the new suburbs, but even at this date there were still unregenerate households using nothing better than the old cesspits. Outbreaks of typhoid continued to be recorded in Perth until well into the 1920s, and although some of these were identified as resulting from the use of milk from contaminated dairies, others may well have been due to primitive sanitation. From 1912, however, it could at last be said that Perth enjoyed something approximating a modern system of water supply and sanitation. In that year, too, all State functions relating to water supply, sewerage, drainage, and irrigation were placed under the unified control of a government department. This was justified on the grounds of economy, higher efficiency, 'and the concentration of specialised engineering and other technical skill'.⁵⁴ As with the 1904 legislation, the change met with approval from most quarters, and indicated the growing need for professionalism in the service.

The responses to Perth's changing needs for water supply and sanitation present an interesting pattern of government growth. In the 1870s and 1880s fear of the cost factor stifled local initiative, and it was left to the colony's few medical practitioners working through the Imperial authorities to urge reforms which could have been imposed only by government paternalism on a scale which was not feasible at a time of growing agitation for responsible government. The Perth City Council was prodded and cajoled into assuming responsibility, but could do so only by remitting authority to a private company which showed itself unable either to prevent the pollution of its services by vested interests or to cope with the massive growth of demand in the 1890s. The Forrest government inherited from its predecessors a belief that sanitation was more appropriately dealt with municipally than at the level of central government, fostering this tendency by the amalgamation of local boards of health with municipal councils. In the case of the Perth City Council any hope of creating an administrative structure adequate for the problems of providing water and sanitation for a boom town was lost when the Forrest government, apparently more by default than by conscious policy, missed the opportunity of extending the boundaries of the Perth City Council's jurisdiction to meet the extension of settlement. Walter James's attempt of 1894 to secure authority for the council was the last forlorn hope of doing so before the proliferation of autonomous suburban councils such as Leederville, Subiaco, and North Perth.

Confronted with this situation, Forrest's performance was not impressive. Far from showing himself eager to extend government initiative in a key area of public hygiene, or even prepared to intervene when its problems were producing obvious social inequality and disharmony, Forrest and his successors persisted in holding the responsibility at arm's length. Long after it was evident that the technological and social problems of water supply and sanitation called for the mobilisation of professional skills by a strong central authority, they continued to pin their hopes on the Metropolitan Waterworks Board. Between 1896 and 1904 the successive chairmen of the board found themselves able to function effectively only by an exercise of personal authority beyond what was normally appropriate for a statutory corporation without direct political responsibility. Keane met the challenge in characteristic buccaneering fashion, and if his lavish methods of getting things done resulted in considerable wastage, this was no more than might have been said of Forrest himself in his approach to such works as the Fremantle harbour and the Coolgardie water supply.

Traylen's single-mindedness, his strength as a crusader, became a liability in office, and he tended to develop into something of a petty tyrant, deaf to viewpoints other than his own; but he also achieved a good deal with the materials at his disposal. It is difficult to avoid the thought that the politicians found the board and its chairmen a useful safety valve whenever public discontent became vociferous. It nevertheless remains puzzling that a source of hardship which impinged so consistently on the daily lives of Perth's householders failed to produce a greater degree of social conflict and overtly political expression, especially when the more prosperous and influential members of Perth society were showing so little social conscience about the use of the city's limited water resources. A great deal of work needs to be done on the sociology of Sir John Forrest's Perth, ranging from the relationships between prominent businessmen and politicians to the survival mechanisms of working class women with small children confronting a waterless summer.

In conclusion it may be worth placing Perth's standards of sanitation in a global context, specifically by a comparison with a small provincial town in Czarist Russia, then as now regarded by most Australians as a by-word for backwardness. In 1898 Anton Chekhov, seeking a warmer climate for his health, settled in the Crimea at Autka. Now a suburb of Yalta, Autka 80 years ago was described as 'a noisy, dirty village with a predominantly Asiatic element'. Here he purchased a cheap block of land for building. It was sewered.⁵⁵

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Much of the material in this article is derived from a research paper, 'Sanitation and water, 1827-1950', prepared by Su-Jane Hunt while working as a research assistant for the Metropolitan Water Supply Sewerage and Drainage Board in preparation for its museum. Geoffrey Bolton researched the political background.

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